





# Reusing Aircraft De-icing Fluid

*"Spent fluid, resulting from aircraft de-icing at Canadian airports, offers a serious environmental and economic challenge. Zenon is involved in the collection of this fluid at a number of airports to help meet environmental regulations. It is natural that we employ our membrane technologies to recover valuable glycol concentrate from this spent fluid for reuse for aircraft de-icing and other applications. Availability of a complete service by Zenon, including a cost effective recovery process will encourage airports to make the necessary investments to meet regulations while saving money."*

Hadi Husain, Vice President  
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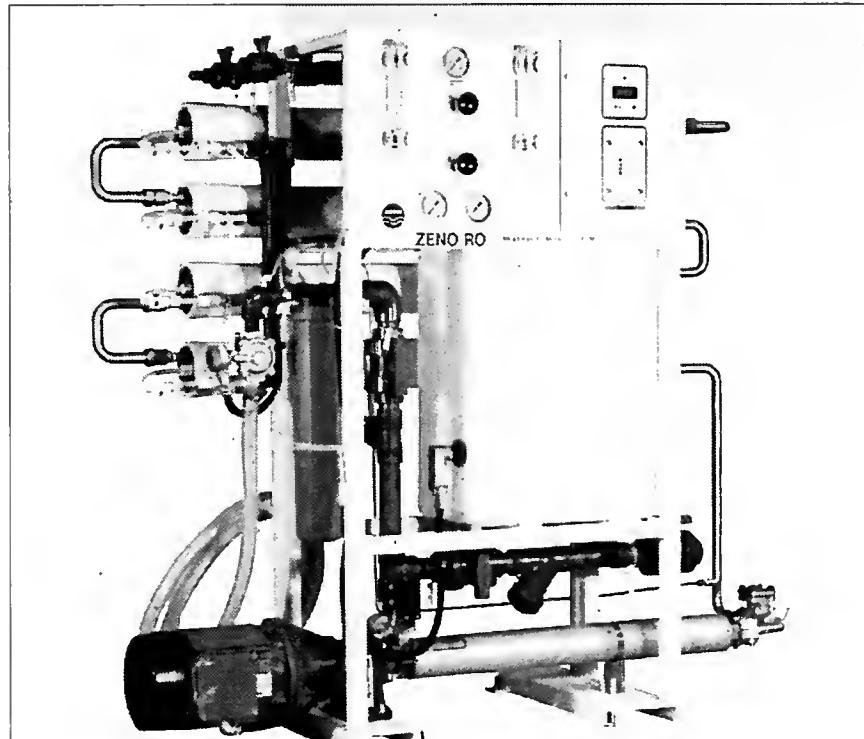
## THE COMPANY

Zenon Environmental Inc. is an advanced technology company which offers a comprehensive range of environmental, analytical and engineering services to consultants, industries and governments. The company specializes in providing innovative and cost effective solutions to complex environmental problems.

Zenon employs more than 300 people in Canada, the United States and Europe. The company's 45,000 square-foot head office in Burlington, Ontario includes a laboratory, pilot plant and manufacturing plant.

## THE CHALLENGE

Airline companies use aircraft de-icing fluid to remove ice from the wings of airplanes. This is a standard safety procedure. At present, the companies either collect the used de-icing fluid and send it to disposal sites or discharge it into the municipal



Zenon Nanofiltration System

sewers. Some companies just leave the de-icing fluid where it lands. The airline companies which fly into Ontario's 11 major airports use more than six million litres of de-icing fluid annually.

In Canada, de-icing fluid is mostly ethylene glycol, diethylene glycol, water and additives. In the United States the major ingredient is propylene glycol. Whatever form it comes in, glycol absorbs oxygen and has a high biological oxygen demand (BOD).

Canada and the United States have passed environmental legislation limiting the amount of glycol in run-off or any effluent which runs into surface waters. Provincial, state and municipal governments also have set limits on the amount of glycol and BOD loading allowed in the waste treated by their sewage treatment plants. Canadian and American airports face

a pressing need for effective ways to treat glycol.

Zenon, through its division Zenon Airport Environmental, is developing turn key solutions to the management of airport de-icing fluid. The solutions include collecting and recycling or destroying it.

Today, Zenon is demonstrating technologies which breakdown de-icing fluid. The company also is developing several processes which use membranes to filter out the sediment and residue that is picked up when the de-icing fluid is sprayed onto aircraft. The sediments and residues have to be removed before the glycol can be used again - either in de-icing fluid or as coolants in other industries. The company is refining these processes as well as the design of the equipment to reduce capital and operating costs and to make the technology more marketable.

## TECHNOLOGY DESCRIPTION

Zenon has tested two types of membrane technologies for cleaning de-icing fluid so that it can be used again.

- 1 Ultrafiltration technology is used to remove sediment and residue.
- 2 Nanofiltration technology is used to filter out dissolved material that may be picked from the runway while the aircraft is being de-iced.

The company is looking at other technologies such as precipitation and evaporation to improve the separation processes and to increase the strength of the cleansed glycol.

Zenon started testing the technologies in the fall of 1995 at the airports in Hamilton, Ontario and Pittsburgh, Penn. These tests will define the performance of the membrane and quality of the product. Further, Zenon is testing alternative technologies to help membrane separation and reduce the final cost of making aircraft de-icing fluid reusable. The company is running these tests at the Hamilton airport in conjunction with the region of Hamilton-Wentworth.

## TECHNOLOGY OPPORTUNITIES

Zenon Airport International has long term contracts with airports in Hamilton and Trenton, Ontario and three U.S. cities. The company's objective is to develop a process that will make re-processing aircraft de-icing fluid cost effective. Zenon plans to market its process to other airports in North America and in Europe.

## PARTNERSHIP IN POLLUTION PREVENTION & RESOURCE CONSERVATION

The development of this technology was funded in part by the Ontario Ministry of Environment and Energy.

Industrial companies which are located in Ontario may participate in ministry/industry programs which will help them to:

- \* reduce, reuse and recycle solid waste;
- \* remediate historic pollution effectively and destroy hazardous contaminants;
- \* reduce or eliminate liquid effluent and gaseous emissions;
- \* use energy and water more efficiently.

Equipment and service supply companies can benefit from the information provided on technologies identified for business development.

## FOR FURTHER INFORMATION, PLEASE CONTACT

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For information on Ministry of Environment and Energy assistance to industry, please contact the Industry Conservation Branch at (416) 327-1492, Fax, (416) 327-1261

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*This project profile was prepared and published as a public service by the Ontario Ministry of Environment and energy. Its purpose is to transfer information to Ontario companies about the applications of new environmental technologies.*

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